Scaling & Area

Exercise

*Diagrams are not drawn to scale.*

1. Work out the ratio **area of shape A : area of shape B** for each pair of similar shapes.
   Give your answers in the simplest form.

a)
3cm A   6cm B

b)
A   B 1.5cm

c)
A   B
Circumference = 8π   Circumference = 4π

d)
5m A 4.5cm   B 5m

e)
4cm A   6cm B

f)
3cm A 4cm   B 20cm

g)
10cm A   4cm B

h)
14cm 9cm A   7cm 6cm B

2. Two similar hexagons are shown.
   The area of hexagon A is 25cm².
   Work out the area of hexagon B.

   4cm A   12cm B

3. Two similar shapes are shown.
   The area of shape A is 54cm².
   Work out the area of shape B.

   9cm A   4.5cm B

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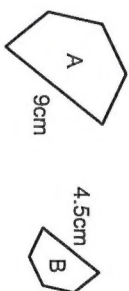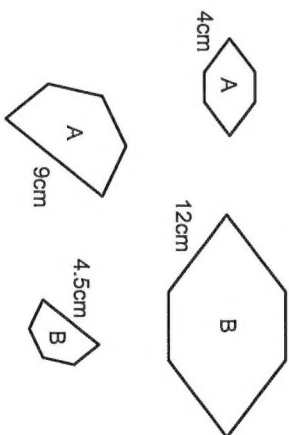
4. Two similar trapezia are shown.
   The area of trapezium A is 48cm².
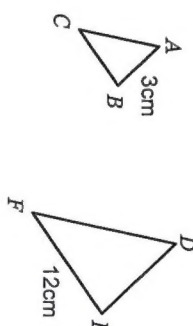   Work out the area of trapezium B.

   6cm A 9cm B
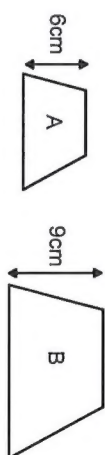
5. Two similar ellipses are shown.
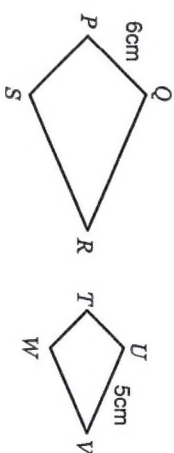   The area of ellipse A is 40cm².
   Work out the area of ellipse B.

   15mm A   12mm B
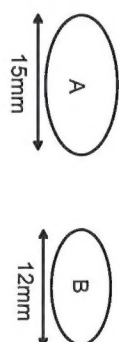
6. ABC and DEF are similar triangles
   with areas 8cm² and 72cm² respectively.

   a) Work out the length of DE.
   b) Work out the length of BC.

   6cm C A 3cm B   F 12cm D E
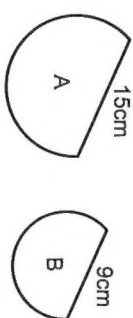
7. PQRS and TUVW are similar kites
   with areas 96cm² and 24cm²
   respectively.

   a) Work out the length of TU.
   b) Work out the length of QR.

   P S Q R 6cm   T W U V 5cm
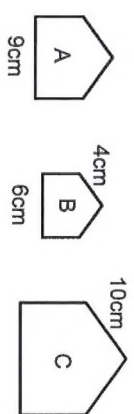
8. Two similar segments are shown.
   Work out the ratio
   Area of segment A : Area of segment B
   Give your answer in the simplest form.

   15cm A   9cm B

9. A and B are two similar rectangles. The area of B is 44% larger than the area of A.
   Rectangle A has a width of 20cm.
   Work out the width of rectangle B.

10. A and B are two similar squares, such that   Area of A : Area of B = 1 : 8.
    Square A has a diagonal length of 3√2 cm.
    Work out the length of a diagonal of square B.

11. A, B and C are three similar shapes.
    Work out the ratio
    Area of shape A : Area of shape C
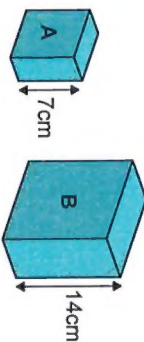   Give your answer in the simplest form.

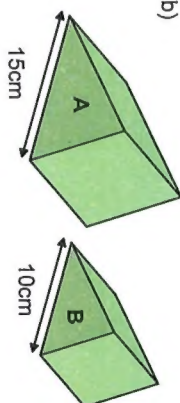   9cm A   4cm B 6cm   10cm C

Exercise

Diagrams are not drawn to scale.

1. For each pair of similar shapes, work out **volume of A : volume of B**. Give your answers in the simplest form.

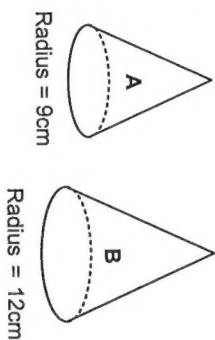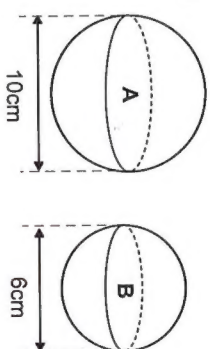   a) A 7cm, B 14cm

   b) A 15cm, B 10cm

   c) A Radius = 9cm, B Radius = 12cm
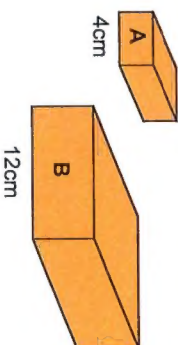
   d) A 10cm, B 6cm

2. Two blocks are cut from the same piece of wood, as shown. The two blocks are similar cuboids.
    A 4cm, B 12cm

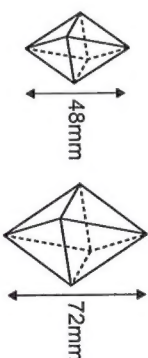   a) The volume of block A is 50cm³. Work out the volume of block B.

   b) The mass of block B is 5.4kg. Work out the mass of block A.

3. Two similar octahedra are shown. The smaller octahedron has a volume of 6.4cm³.

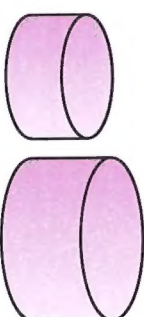   Work out the volume of the larger octahedron.
    48mm, 72mm

4. Two containers are in the shape of similar cylinders. The containers have diameters of 12cm and 16cm. The larger container has a capacity of 1.6 litres.
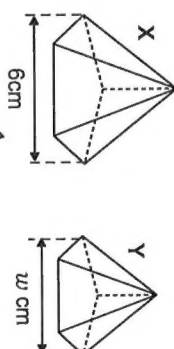
   Work out the capacity of the smaller container.

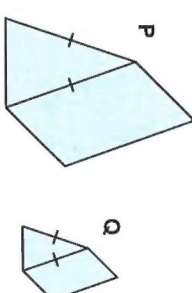5. X and Y are similar pyramids. The volume of X is 135cm³. The volume of Y is 40cm³.

   Work out the value of w.
    X 6cm, Y w cm

6. P and Q are similar prisms. The volume of P is 2000cm³. The volume of Q is 686cm³. The height of P is 20cm.
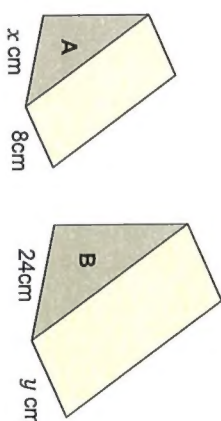
   Work out the height of Q.

7. Shape B is an enlargement of shape A. The volume of B is 72.8% larger than the volume of A.

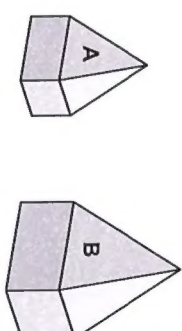   Work out the values of x and y.
    A x cm, 8cm; B 24cm, y cm

8. A and B are two similar 3D shapes. Surface area of A : surface area of B = 4 : 9.

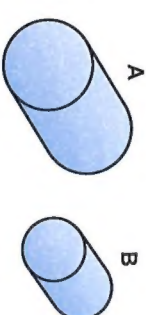   a) Work out the ratio of the volume of A to the volume of B in the simplest form.

   b) The volume of A is 76cm³. Work out the volume of B.

9. A and B are two similar cylinders. The surface area of A is 150π cm². The surface area of B is $\frac{75}{2}\pi$ cm². The volume of A is 250π cm³.

   Work out the volume of B in terms of π.

10. A and B are two similar frustums. Volume of A : volume of B = 64 : 27. The surface area of A is 72π cm².

    Work out the surface area of B.